Appendix III - Training

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General:

The nature of work measurement is such that individual differences in the characteristics of persons measuring work can influence the end result. To assure a valid base of work measurement data, these individual differences must be minimized. The effect of individual differences can be reduced to a minimum by:

a. Standardization of Training.

b. Periodic performance rating training.

c. Application of standard time data.

Standardization of work measurement training has been accomplished within the Department of Defense by designating a single defense agency, the Army Management Engineering Training Activity (AMETA), as the focal point for developing and providing standard management engineering training courses to all DoD activities and by requiring AMETA certification of all DoD instructors who teach these courses. Standard Time Data and other specialized training is accomplished both as an integral part of work measurement training courses or as distinct separate courses.

Work Measurement training consists of basic courses for new personnel and specialized courses for maintaining or upgrading proficiency consistent with career development. It is the responsibility of each organization to take advantage of available training to insure the technical competence of assigned management engineering personnel. It is an essential requirement of the DoD Productivity Program that personnel engaged in Methods and Standards work successfully complete the Defense Work Methods and Standards Course (DWMS) and exhibit a proficiency in the application of the techniques covered in the course before they are considered qualified as work measurement technicians/analysts. Also of utmost importance when standards are being developed by using either time study or work sampling is the task of correctly evaluating observed performance and relating it to an acceptable concept of normal. Training on a continuing basis with periodic performance rating sessions is required for management engineering personnel who rate operator performance in order that they maintain this ability.

The end result of these efforts at standardization within the Department of Defense is to provide:

a. Uniform applications of work measurement to produce consistent and comparable data.

b. Personnel who can be used in or transferred from one organization or activity to another without extensive retraining.

c. The capability for pooling the training of personnel regardless of parent component, organization, or activity thus affording savings in both training and travel funds.

Introduction to Available Courses

The overall continuing mission of the Army Management Engineering Training Activity (AMETA) is to improve the management and use of the Productivity Systems through effective education, research, doctrine and information and consulting programs. The curriculum consists of a comprehensive body of knowledge encompassing scientific management techniques and practices. The courses are principal, concept and/or technique oriented, and every effort is made to demonstrate best management practices so the enrollee can apply knowledge gained upon return to his installation. Following is a brief description of some of the pertinent Industrial and Management Engineering Courses that are available.

Defense Work Methods and Standards (DWMS)

The Defense Work Methods and Standards Course is a five week (200 hours)course normally taught at AMETA although arrangements can be made for the course to be taught on site. The specific course objectives are to provide the enrollee with the skills necessary to:

a. Analyze and design work methods and procedures.

b. Establish non-engineered work measurement standards.

c. Establish engineered work measurement standards.

d. Design and use a work measurement hierarchal structure that will support the information needs of the management processes of budgeting, staffing control, and work planning and control.

The methods of instructions used are lecture conferences, practical exercises, shop projects, and examinations.

The enrollee is presented a definitive concept of the Management Process to give him an understanding of the on-going activities of management. Within the framework of this Management Process, the Work Measurement Standards and Methods efforts can be analyzed in detail and related to the total management effort.

Through grounding is provided in various techniques employed in methods improvement and work measurement. Topics in the methods portion of the course include cost analysis, work sampling, value engineering, process analysis, operations analysis, and multi-activity analysis. Facility layout and materi als handling are also considered. Through lecture and practical exercises, the enrollee develops skill in analyzing, designing, developing, and presenting improved methods dealing with the flow of work manual activities, operator machine relationships, and crew activities.

The work measurement portion of the course concentrates on the development of work measurement standards. Major emphasis is given to engineered standards, e.g., direct time study, rated work sampling, standard data systems, and predetermined time systems. Consideration is also given to development of non-engineered standards and standards for intermittent work flow. Topics include technical and professional estimates, statistical standards, simulation, and waiting line techniques. These approaches are discussed as a means of handling work measurement in areas not readily adaptable to engineered standards.

The course is designed for persons presently engaged in, or soon to be assigned to, methods study and work measurement activities. This course is not designed for supervisory personnel nor staff personnel who require an appreciation of methods improvement and work measurement. Experience has shown that satisfactory performance in this course is unlikely without proficiency in basic statistics and algebra; matematical symbols, handling of decimals, fractions, and simple equations, and plotting of statistical data. Where this proficiency does not exist, an opportunity should be provided to the enrollee to develop these skills prior to assignment to the class.

An integral part of the DWMS course of instructions on the application of the time study or work sampling techniques is concerned with evaluation of performance or performance rating. The procedure for evaluating performance, when developing labor performance standards by stop watch or work sampling, is commonly called rating or leveling. The factor by which the average performance time is multiplied, in order to adjust for difference in performance above or below average, is called a Rating Factor.

The purpose of training in Performance Rating is to enable each individual to relate his rating to an acceptable norm. There are four methods of performance rating which are endorsed for use within the Department of Defense and are taught in the DoD work-measurement courses. Of these four methods, one can usually be selected as the most appropriate for a given set of circumstances. The selection of the best method to be used becomes obvious as the circumstances are evaluated.

The performance rating methods approved for use throughout the Department of Defense are:

a. Conventional

b. Objective

c. Westinghouse

d. Synthetic Leveling

Defense Work Measurement - Standard Time Data (DWMSTD)

This course is a two week (80 hours) course designed to provide enrollees with a working knowledge of the Defense Work Measurement Standard Time Data Program (DWMSTDP) with emphasis on the uniform application of the standard time data elements included in the program. In addition, the course provides the enrollee with knowledge of the latest techniques of work measurement for the development of standard time data. Instructional techniques include lecture conference, practical exercises and examination.

The course content provides an in-depth coverage of the Defense Work Measurement Standard Time Data Program. Topics include the coding structures, source and location of various levels of data, element descriptions, time values, quality of data and selection of universal and occupation related data. Emphasis is placed on enrollees application of the data in developing labor performance standards. The course includes methodology for the application of data from the applicable DWMSTDP Volumes.

In addition, the course treats the development of new and supplemental standard time data using various work measurement and data presentation techniques in order to fill voids in the DoD data bank and to develop unique/specific data coverage.

This course is designed for methods and standards supervisors, analysts/technicians and planner estimators actively engaged in applying labor performance standards and possessing basic knowledge in the methods and standards development area. Experience has shown that satisfactory performance in this course is enhanced by a review of basic work methods and standards techniques prior to attendance.

Defense Work Methods and Standards (DWMS) - Orientation Seminar

This orientation seminar is a two day (16 hours)course designed to provide the enrollees with a general understanding of the basic techniques of methods study and work measurement, the use of DWMS information by the supervisor, and the relationship of DWMS to the management process. The methods of instruction used are lecture conferences and practical exercises.

This orientation includes an introduction to the DWMS program, the role of work measurement in performance measurement, the need for quality of work measurement standards, the use of standards in staffing and budget development, and the use of DWMS information in productivity improvement. The course includes an overview of the basic principles of methods improvement to cover the flow of work, manual activities, layout studies, and operator-machine relationships. Emphasis is placed on logical and systematic approach to methods study. The use of work sampling, pre-determined time systems, and direct time study to establish engineered time standards are presented. The development and use of statistical time standards, staffing patterns, technical estimates are covered as techniques for non-engineered standards. The relationship of the work methods and standards functions to other management functions is examined to provide the enrollees with a knowledge of the basic

requirements and elements for a successful DWMS program.

This course is designed for supervisors of mission (line) activities and staff personnel (managers and action officers) whose work requires a general understanding of methods improvement and work measurement. It is not intended for the technician engaged in methods improvement and work measurement studies or supervisors of these functions.

Productivity Orientation Seminar

This orientation seminar is a 1 week (40 hours) course designed to provide enrollees with the latest knowledge on methods useful in measuring and enhancing productivity in both product and service type organizations. The methods of instruction used are lecture conferences and case studies.

This orientation seminar is concerned with the need, and the means for increasing productivity throughout all elements of the Federal sector. Consideration is given to the methods available to managers for increasing productivity in any operation. Attention is directed to the use of high level performance measures in the traditional processes of workload programming, resource allocation, budgeting, and work planning and control systems. Emphasis is placed on the use of work methods and standards in the Defense Productivity Program.

Specific topics covered include: the history of performance measurement in the Government; concepts of effectiveness and efficiency; integration of work unit, unit cost, productivity measurement, and work measurement; selection of performance measures; establishment of performance baselines; performance assessment and control; and effectiveness/efficiency tradeoffs. The use and role of job design techniques, capital investment, and work planning and control, are addressed as they relate to increased productivity in any organization.

This course is designed for functional managers responsible for initiating action to measure and enhance organizational productivity. Other applicants will be considered on an individual basis. This course is not for personnel who will be directly involved in the actual design and implementation of productivity measurement systems. Those individuals should consider the course, "Productivity Measurement and Enhancement Methods (JT)".

Productivity Measurement and Enhancement Methods (JT).

This course is a two week (80 hours) course designed to provide the enrollee with the skills necessary for measuring and enhancing productivity in both the product and the service type organizations. Specific topics covered are:

a. Efficiency and effectiveness measurement.

b. Productivity indicators.

c. Productivity planning and control.

d. Labor productivity measurement.

e. Productivity enhancing capital investment.

f. Productivity enhancing methods.

g. Job enrichment.

The methods of instruction used are lecture conferences, practical excercises and case studies.

The enrollee is presented a definitive concept of productivity and related performance measurement systems. Topics typically covered include: concepts of effectiveness and efficiency; integration of work unit, unit cost, and productivity measurements; selection and computation of performance measures; integration of detailed and summary level performance measures; establishment of performance baselines; integration of performance measures into the management processes of workload programing, resource allocation, budgeting, and work planning and control systems; performance assessment, trend analysis, input/output analysis, status determination, forecasting; and auditing of performance measurement systems.

Specific techniques useful for establishing performance indicators are addressed. These include: multiple correlation and regression analysis, parametric estimating, linear programing, standard data systems, work measurement techniques, and indirect staffing analysis.

Consideration is also given to a variety of productivity enhancement methods. Typical subjects covered are: capital investment analysis, job design, standard unit costs, methods and procedures studies, employee motivation and work planning and control systems.

This course is designed for staff analysts assigned the responsibility for designing and implementing productivity measurement and enhancement systems. Typical enrollees would include industrial engineers, management analysts, and staffing and budget specialists who have a responsibility for assessing the utilization of resources.

NOTE: This is not a course in basic work measurement for the development of detailed standards.

Methods Time Measurement (MTM)

Methods-Time-Measurement (MTM) is a procedure which analyzes any manual operation into the basic motions required to perform it and assigns to each motion a predetermined time standard which is determined by the nature of the motion and the conditions under which it is made.

MTM classifies all motions required to perform an operation into ten classes or kinds of motions. A predetermined time has been assigned to each motion that takes into account the nature of the motion and the conditions under

which it is made. These times represent the time for an average operator to perform the motion. The time values associated with the MTM elements are expressed in Time Measurement Units (TMU's). Each TMU is equal to .00001 hour or .0006 minute. These time values have already been "leveled" or adjusted to provide times for the normal operator working at a normal pace.

Advantages of MTM over other work measurement techniques:

a. Eliminates need to level (rate) operator performance.

b. Forces analyst to concentrate on methods analysis.

c. Requires a more exact description of the method.

d. Permits methods to be determined prior to production.

e. Results in more consistent standards.

f. Limits use of the stop watch.

g. Shifts grievances from performance rating to fact.

h. Allows a more scientific approach to methods engineering by providing basic motion and time data.

MTM is probably the most widely used of all predetermined time systems. One reason for this is the advantage to MTM users of the continuing research carried out by the Association. These research programs have resulted in the publication of a number of MTM Research Reports, which are available through the MTM Association.

There are currently three of the MTM Systems used in DoD.

a. MTM-1 which was developed where precision time values are necessary.

b. MTM-2 which reduces analysis time but does so at the expense of prediction accuracy and,

c. MTM-3 which was developed to have an application time approximately three times as fast as MTM-2.

It is very important that only those who have been trained and have been qualified as an MTM practitioners in MTM-1, MTM-2 or MTM-3 be permitted to use the applicable MTM technique. The following paragraphs will provide more details on each system in the MTM family.

Methods - Time Measurement - 1 (MTM-1) (JT)

This course is a three week (120 hours) course designed to provide the enrollee with a working knowledge of Methods-Time Measurement - 1 technique for establishing engineered standards. The methods of instruction used are lecture

conferences, practical exercises, shop project, and examination.

MTM-1 is a standardized course of instruction developed by the Methods-Time Measurement Association (a non-profit organization) and presented by a qualified and certified MTM-1 practitioner. The course covers procedures to be used in the study and analysis of work motions, and in the assigning of proper time values to each basic motion. Specific items covered include:

a. Developing and improving methods.

b. Establishing production time standards.

c. Developing standard data.

d. Using MTM-1 data for estimating and scheduling.

e. Using MTM-1 data for training operators.

f. General Purpose Data (GPD) familiarization.

g. MTM-2 and MTM-3 familiarization.

The final examination for this course is a standardized test and will be graded by the MTM Association. Enrollees who achieve a passing grade on this examination will receive a certificate of recognition as an MTM-1 applicator from the MTM association.

This course is designed for persons presently engaged in (or soon to be assigned to) the methods study or work measurement activity and who will be assigned to activities requiring the application of Methods-Time Measurement (MTM-1). This course is not designed for supervisory personnel and staff personnel who require an appreciation of methods improvement or work measurement.

Methods-Time Measurement 2A (MTM-2A)

This course is a one week (40 hours) course designed to provide the enrollee with a working knowledge of the Methods-Time Measurement-2 (MTM-2) system, the second general level of MTM data. The methods of instruction used are lecture conferences, practical exercises, film loops and examination.

MTM-2A is a standardized course of instruction developed by the Methods-Time Measurement Association (a non-profit organization) and presented by an Association certified MTM-2 instructor. This course covers procedures to be used in the study and analysis of work motions and the assigning of proper time values to these motions.

The specific items covered include:

a. Development of MTM-2.

b. Study of Get and Put and Weights.

c. Study of Applied Pressure, Regrasp, Eye Action, Foot Motion, Step, Bend and Arise, and Crank.

d. Study of Simo Motions and Combined Motions.

e. Practical Exercises and Examinations.

f. Film Loop Analysis.

This course is designed for qualified MTM-1 applicators who intend to use MTM-2 for estimating and standard setting purposes. Persons enrolling in this course should be presently engaged in methods study or work measurement activity. This course is not designed for supervisory and staff personnel who require an appreciation of methods improvement and work measurement.

Certification in MTM-1 is a prerequisite for this course.

Methods-Time Measurement 2B (MTM-2B)

This course is a two week (80 hours) course designed to provide the enrollee with a working knowledge of Methods-Time Measurement 2B (MTM-2B). The methods of instruction used are lecture conferences, practical exercises, film loops, and examination.

A standardized course of instruction developed by the Methods-Time Measurement Association (a non-profit organization) and presented by an Association certified MTM-2 instructor. The course covers procedures to be used in the study and analysis of work motions and the assigning of the proper time values to the motions. During the first week, a review of Work Simplification, Methods Improvement, and the basic elements of MTM-1 are presented. The MTM-2 elements and the principles of application are studied during the second week. Specific items covered in the first week include:

a. Work Simplification and Methods.

b. The basic motions and definitions of MTM-1.

c. Developing standard time data.

Specific items covered in the second week (MTM-2) include:

a. Development of MTM-2

b. Study of Get and Put and Weights.

c. Study of Apply Pressure, Regrasp, Eye Action, Foot Motion, Step, Bend and Arise, and Crank.

d. Study of Simo Motions and Combined Motions.

e. Practical Exercises and Examinations.

f. Film Loop Analysis.

This course is designed for those individuals who are not qualified in MTM-1 but who intend to use MTM-2 for estimating and standard setting purposes. Persons enrolling in this class should be presently engaged in the methods study or work measurement activity. This course is not designed for supervisory and staff personnel who require an appreciation of methods improvement and work measurement.

Methods-Time Measurement -3 (MTM-3) (JT)

This course is a one week(40 hours) course designed to provide the enrollee with a working knowledge of Methods-Time Measurement-3 (MTM-3) which is the third general level of the family of MTM data. The methods of instruction used are lecture conferences, practical exercises, film loops and examination.

MTM-3 is a standardized course of instructions developed by the Methods-Time Measurement Association (a nonprofit organization) and presented by an Association certified MTM-3 instructor. The course is intended as a supplementary tool for those who are already qualified in MTM-2 and have a need for a system of time data even faster in application than MTM-2. MTM-3 is applicable in situations where there is considerably less demand for detailed methods description and highly precise time determinations.

This course is designed for qualified MTM-2 applicators who wish to extend their use of the MTM systems to jobs which occur in small batches and where the methods and motion distances can vary considerably from cycle to cycle. This course is not designed for supervisory and staff personnel who require an appreciation of methods improvement and work measurement. NOTE: Certification in MTM-2 is a prerequisite for this course.

Maintaining Proficiency in Work Measurement

An effective and continuous training program is essential to bring proficiency in work measurement to a prescribed level and to maintain or upgrade that level. One area that requires continued review and evaluation is in performance Rating or Leveling. The time value determined for an operation must be applicable to all operations, good, bad or indifferent. Consistency in determining the leveling factor within the established range is necessary to insure the accuracy of the standards.

Training in performance rating is divided into a developement phase designed to establish rating proficiency and a maintenance phase designed to maintain that proficiency. The development phase consists of both orientation and practice sessions. Those students not meeting an acceptable proficiency level must continue in the development phase until they do. The maintenance phase is limited to practice sessions and should be given at regular intervals. For conventional, objective, and Westinghouse methods, rating films (such as those developed by the Society for Advancement of Management and by AMETA) are used in both phases of the training program.

Performance Rating training material is provided by AMETA for all practitioners of work measurement within the Department of Defense. This material contains all the details for successful application of Performance Rating and is an integral part of the Defense Work Measurement and Standards Course.